



The importance of internal health beliefs for employees' participation in health promotion programs



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ABSTRACT

Objective. To investigate associations between employees' health locus of control (HLOC) and self-perceived health, health behaviors, and participation in health promotion programs (HPPs) and the mediating effect of self-perceived health and health behaviors on the relation between HLOC and participation.

Method. Between 2010 and 2012, a six-month longitudinal study was conducted among 691 Dutch employees. Using questionnaires, information was collected on health behaviors, self-perceived health, HLOC, and intention to participate at baseline. Actual participation was assessed at follow-up. Logistic regression analyses were used to study associations between HLOC and self-perceived health, health behaviors, and participation, and to examine whether associations between HLOC and participation were mediated by self-perceived health and health behaviors.

Results. Higher internal HLOC was associated with sufficient physical activity (moderate: OR:1.04, 95%CI:1.00–1.08; vigorous: OR:1.05, 95%CI:1.01–1.10) and fruit and vegetable intake (OR:1.05, 95%CI:1.01–1.09), a good self-perceived health (OR:1.20, 95%CI:1.11–1.30), a positive intention towards participation (OR:1.05, 95%CI:1.00–1.09), and actual participation (OR:1.06, 95%CI:1.00–1.13). Self-perceived health or health behaviors did not mediate associations between HLOC and participation.

Conclusion. Employees with a higher internal HLOC behaved healthier and were more likely to participate in HPPs, irrespectively of their health. Increasing internal HLOC seems a promising avenue for improving employees' health and participation in HPPs.

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Introduction

An unhealthy lifestyle is a major risk factor for several chronic diseases (World Health Organization, 2003). Numerous health promotion programs (HPPs) are developed to improve health behaviors. Workplaces are considered to be a promising setting for health promotion because of the amount of time people spent at work, the possibility to reach a large population, and the presence of supportive social networks (Dishman et al., 1998; Hutchinson and Wilson, 2012). Workplace health promotion programs (WHPPs) are able to improve health behavior and health (Anderson et al., 2009; Conn et al., 2009; Maes et al., 2011). However, participation in these WHPPs is often modest (Robroek et al., 2009) and it is questioned whether those employees who could benefit most are participating (Jørgensen et al., 2013). This limits the potential health benefits of WHPPs. It is therefore important to study factors that potentially impede or facilitate participation.

Peoples' perceptions about who is in control over their health differ and are conceptualized in the concept of health locus of control (HLOC)

(Wallston et al., 1978). Internal HLOC means that people feel they have influence over their health, whereas external HLOC refers to feelings that others (e.g. doctors) are in control over one's health or it is due to luck or fate (Wallston et al., 1978). A higher internal HLOC is associated with a healthier behavior and with a good self-perceived health (Grotz et al., 2011; Janowski et al., 2013; Saklofske et al., 2007; Steptoe and Wardle, 2001). A higher internal HLOC contributes also to searching for health information online (Roncancio et al., 2012), and individuals with a high internal HLOC adhere better to treatment regimes, screening calls, and medical check-ups (Gili et al., 2006; Kudo et al., 2008; Omeje and Nebo, 2011).

Thus, a high internal HLOC can be regarded as a personal characteristic positively related to adopting healthy behaviors and health-related activities. However, the influence of HLOC on participation in HPPs has not been studied. Furthermore, the relation between HLOC and participating in health-related activities might be explained by the association between HLOC and health behaviors or self-perceived health. The extent to which those characteristics have a mediating influence on the relation between HLOC and participating in health-related activities is unknown. This study aimed to gain insight into (1) associations between employees' HLOC and health behavior and self-perceived health, (2) associations between employees' HLOC and participation in

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HPPs, and (3) the potential mediating effect of health behaviors and self-perceived health on the relation between HLOC and participation in HPPs.

Methods

Study population

The population in this longitudinal study consisted of employees of a plastic manufacturer (organization 1, $n = 874$) and a paint manufacturer (organization 2, $n = 1281$) in the Netherlands.

Between 2010 and 2012, all employees were invited by e-mail to fill in two online questionnaires: a baseline questionnaire and a follow-up questionnaire six months later. For this study, we included all employees who completed both the baseline and follow-up questionnaires.

Of the 2155 employees invited, 1128 (52%) completed the baseline questionnaire. Of this group, 761 (68%) also completed the follow-up questionnaire after six months and 748 employees (98%) provided informed consent. Four employees were excluded due to implausible or missing data on height, weight, or physical activity, and 53 employees because of incomplete information on HLOC. The final study sample comprised 691 employees (organization 1, $n = 226$; organization 2, $n = 465$).

Informed consent was requested at the start of the questionnaire. The Medical Ethical Committee of Erasmus MC (Rotterdam, the Netherlands) declared that the Medical Research Involving Human Subjects Act did not apply to the current study and the committee had no objection to the execution of this study.

Data collection

Participation in a health promotion program

At baseline, participants were asked whether they had the intention of participating in a WHPP. To enhance comparability with actual participation, the five possible answers were dichotomized into 'totally agree, agree' and 'totally disagree, disagree, neutral'. At six-month follow-up, employees were asked whether or not they had participated in a HPP during the follow-up period.

Health locus of control

At baseline, HLOC was measured using the 18-item multidimensional health locus of control questionnaire, which distinguished internal HLOC and two components of external HLOC, namely powerful others HLOC, and chance HLOC. Each HLOC-scale was assessed by six statements (Cronbach's $\alpha = 0.71, 0.76, \text{ and } 0.71$, respectively) (Halfens and Philippen, 1988; Wallston et al., 1978). Per statement, the participant had to answer on a six-point scale ranging from strongly disagree (0) to strongly agree (5). Sum scores were calculated for internal HLOC, powerful others HLOC, and chance HLOC, ranging from 0 to 30.

Self-perceived health and health behavior

Self-perceived health and health behaviors were measured at baseline.

Self-perceived health was measured using the first question of the Short Form-12 (SF-12) questionnaire ("Overall, how would you rate your health during the past 4 weeks?"). The five possible answers were dichotomized into 'poor or fair' and 'good, very good, or excellent' (Ware et al., 1996).

Body Mass Index (BMI: $\text{weight}/\text{height}^2$) was calculated based on self-reported height in meters and weight in kilograms and dichotomized ($\text{BMI} < 30 \text{ kg}/\text{m}^2$ and $\text{BMI} \geq 30 \text{ kg}/\text{m}^2$).

Fruit and vegetable intake was measured by a slightly adapted version of the Dutch Food Frequency Questionnaire (Bogers et al., 2004). The six-item questionnaire asked about the monthly intake of different fruits (four items, e.g. apple, fruit juice) and vegetables (two items: raw and cooked vegetables). Dichotomization was based on the Dutch guidelines for healthy nutrition, which states that one needs to consume

200 g of fruit and 200 g vegetables daily. Employees who ate at least 400 g of fruit and vegetables per day were considered those meeting the guidelines.

Physical activity was measured by a slightly adapted version of the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003) which measures physical activity of moderate and vigorous intensity. The average leisure time spent on moderate and vigorous intensity physical activity was calculated as follows: employees were first asked how many days per week they engaged in moderate and vigorous intensity physical activity; they were then asked how many minutes on average was spent on moderate or vigorous intensity physical activity, per occasion. Dichotomization was based on the recommendation for moderate physical activity that requires physical activity at moderate levels for at least 30 min per day (Haskell et al., 2007). Employees who were physically active at a moderate intensity level for at least 210 min a week (7 times 30 min) were considered those meeting the recommendation. Someone who was active at vigorous intensity for at least 20 min on at least three occasions per week met the recommendations for vigorous intensity physical activity.

Smoking was assessed using a single-item question: "Do you smoke?". Answer possibilities were: 'yes', 'now and then', and 'no'. Employees answering the question with 'yes' or 'now and then' were defined as being a 'current smoker'.

Individual characteristics

At baseline, the following individual characteristics were assessed: age, gender, and educational level. Age was categorized into two groups: 18–39 and 40–65 years of age. Educational level was determined by asking the employees about their highest level of education, which was then dichotomized into 'low' (primary school, lower and intermediate secondary schooling, or lower vocational training) and 'high' (higher secondary schooling, intermediate vocational schooling, higher vocational training, or university).

Data analysis

Descriptive statistics were used to report on characteristics of the study population. The Pearson correlation coefficient was used for correlations between the internal HLOC, powerful others HLOC, and chance HLOC.

Logistic regression analyses were performed to study associations between HLOC-scales and health behaviors, and self-perceived health; and to examine whether health behaviors, self-perceived health, and HLOC are associated with intention to participate and actual participation in HPPs. These associations were adjusted for individual characteristics.

The mediating effect of health behaviors and self-perceived health on the association between the HLOC-scales and intention to participate and actual participation was assessed using the step-approach of Baron and Kenny (1986). First, associations between the independent (i.e. HLOC-scales) and dependent (i.e. participation) variables, and second between the independent and the potential mediating (i.e. health behaviors and self-perceived health) variables were tested as described in the previous paragraph. Thereafter, by logistic regression analysis, associations between the potential mediators and dependent variables were assessed adjusted for the independent variables and controlled for individual characteristics. Last, the first step was repeated now also adjusted for the mediators that were statistically significantly associated with both a HLOC-scale and with participation to assess the effect of the mediator.

The odds ratio (OR) was estimated as measure of association with a corresponding 95% confidence interval (95%CI). For HLOC, this entails that by every point increase (range 0–30) the odds on the outcome variable will increase by that odds. All analyses were carried out using the IBM SPSS Statistics version 20 for Windows (SPSS Inc., Chicago, IL, USA).

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